

**REMARKS**

Applicants thank the Examiner for the very thorough consideration given the present application. Claims 1, 3-9 and 11-13 are currently pending in this application. None of the claims have been amended. Accordingly, no new matter has been added.

In view of the remarks herein, Applicants respectfully request that the Examiner withdraw all outstanding rejections and allow the currently pending claims.

**Issues under 35 U.S.C. 102/103**

Claims 1, 3-9 and 11-13 stand rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hori et al. (US 2002/0193555) (hereinafter "Hori"). Applicants respectfully traverse.

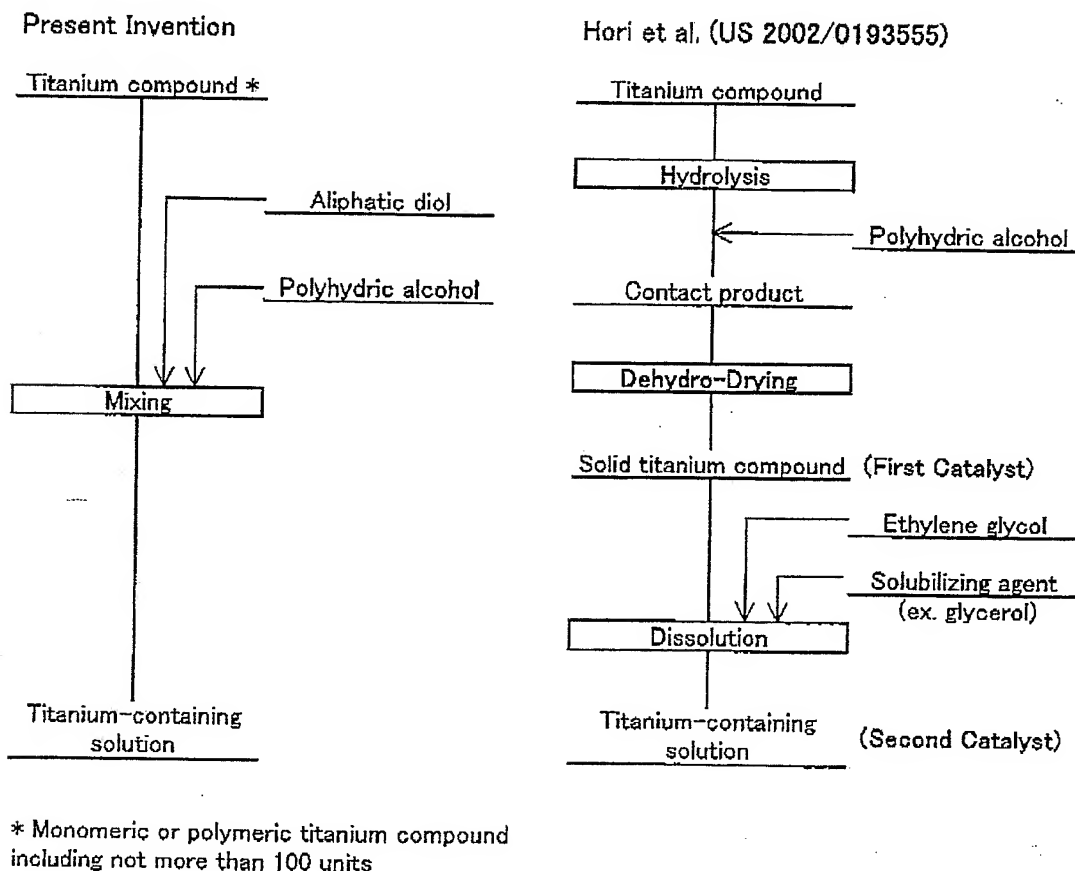
The Examiner maintains that Hori teaches a titanium catalyst for the preparation of a polyester resin by polycondensation of an aromatic dicarboxylic acid with aliphatic diol useful in the production of blow molded products.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of anticipation. For anticipation under 35 U.S.C. §102, the reference must teach each and every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). "Anticipation of a patent claim requires a finding that the claim at issue 'reads on' a prior art reference." *Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999) (quoting *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 781 (Fed. Cir. 1985)).

Moreover, Applicants submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). “[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability.” *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. *KSR Int’l Co. v Teleflex Inc.*, 82 USPQ 2d 1385 (U.S. 2007). There must be a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* The Supreme Court of the United States has recently held that the “teaching, suggestion, motivation test” is a valid test for obviousness, albeit one which cannot be too rigidly applied. *Id.* “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

The present invention is directed, *inter alia*, to a titanium-containing solution and process of manufacturing the same (see, e.g., claims 1, 4 and 6). Distinctions between the present invention and Hori have been placed before the Examiner in the past (see, for example, Response to Office Action filed on January 13, 2009). Applicants respectfully submit that it appears that the Examiner’s position is based on a misunderstanding of the teachings of Hori.

The Examiner's attention is directed to the process flow diagrams below:



As is evident from the flow diagrams above, the presently claimed titanium-containing solution is prepared by using a monomeric or polymeric titanium compound including not more than 100 units as a **starting material** (emphasis added).

In contrast, Hori discloses that a solid titanium compound (i.e., the first catalyst) is

prepared by using a monomeric titanium compound (titanium halide or titanium alkoxide) as a starting material. The contact product of titanium halide or titanium alkoxide with a polyhydric alcohol is subjected to dehydro-drying (see [0060], [0063], [0083] and Examples). Hori further discloses that the first catalyst is mixed with ethylene glycol and a solubilizing agent and subjected to a dissolution process in order to obtain a titanium-containing solution (i.e., the second catalyst) (see [0137]).

The Examiner is respectfully reminded that the claims must be interpreted in light of the Specification. At page 18, lines 16-22 of the Specification, Applicants disclose:

*The titanium compound used for preparing the titanium-containing solution refers to the titanium starting material used in the final preparation of the solution. In the case where solid A is dissolved and dried to obtain solid B, and then a solution is prepared by dissolving the solid B, the aforementioned titanium compound refers to the solid B (emphasis added).*

As is clear from the description above, in the process of Hori, the titanium compound subjected to hydrolysis is equivalent to the above-described “solid A.” The solid titanium product (i.e., first catalyst) obtained from dehydro-drying the contact product of the titanium compound is equivalent to the above-described “solid B.” The present claims require that the solid B (i.e., the titanium compound used in the final preparation of the solution; see above) be a monomeric or polymeric titanium compound including not more than 100 units. However, Hori fails to teach or suggest this, as the solid titanium compound (i.e., first catalyst) of Hori includes **more than 100 units** (emphasis added) (see Comparative Example 11 in the present Specification, which shows that the degree (n) of a titanium compound

prepared as described in Hori is 109 or higher).

Accordingly, since the titanium compound used as a starting material during preparation of the titanium-containing solution of the present invention is different from that of Hori, the resulting titanium-containing solution of the present invention is also different from the titanium-containing solution (i.e., second catalyst) of Hori. Thus, Applicants submit that Hori does not teach or suggest a titanium-containing solution as presently claimed.

At page 3, lines 15-19 of the outstanding Office Action, the Examiner states that “[s]ame related to limitation of Claim 6: as substantially same, titanium containing solution disclosed by Hori, will inherently have same particle sizes as it (sic) claimed by applicant in Claim 6. Also note, that particle of any size may be present in composition, because language of Claim 6 does not exclude presents (sic) of any specific particles of any size.” Applicants respectfully disagree.

As noted above, the titanium-containing solution of the present invention is very different from the titanium-containing solution (i.e., second catalyst) of Hori. Thus, the second catalyst of Hori does not inherently possess the properties claimed. Moreover, Applicants note that the phrase “in which the particle size of the titanium-containing compound in the solution is **mainly** from 0.4 nm to 5 nm” in claim 6 clearly implies that, in the titanium-containing compound used to produce the claimed titanium-containing solution, 50% or more of the titanium-containing compound has a particle size of from 0.4 nm to 5 nm (see page 33, line 23 to page 34, line 4 in the Specification). However, as shown in Table 4 of the present Specification, the titanium-containing solution of Comparative Example 11, which is similar to that of Hori, does not meet this requirement.

At page 4, line 20 to page 5, line 4 of the Office Action, the Examiner states that the “degree of polymerization of titanium containing compound was measured by Applicant on solid particles before dissolving in solvent. Because, catalyst solution obtained by dissolving solid particles in solvent (which is used for polyester polymerization) which lead to significant reduction in particles size (from microns to nanometers) degree of units in solid particles is not applicable to degree of units in particles after dissolving in solvent.”

Applicants respectfully disagree and submit that the dissolution of the titanium compound into aliphatic diol is not a mere dissolution, but rather involves certain chemical reactions. As shown by the enclosed excerpt from the Encyclopedia of Chemical Technology, a high polymerization product in a network-like form is generated when a titanium compound is contacted with an aliphatic diol and is dissolved or precipitated in the network-like form (see, also, Specification, page 3, lines 10-21). As such, the molecular weight (degree of polymerization) of the titanium compound is not reduced, but rather increased by dissolution.

As previously discussed, the titanium containing solution (i.e., second catalyst) of Hori is prepared by using the solid titanium compound which is obtained by hydrolyzing a titanium compound (monomeric compound) and dehydro-drying the hydrolyzate. The solid titanium compound includes more than 100 units after hydrolyzing and dehydro-drying, as demonstrated by Comparative Example 11 and discussed above. When such a polymeric titanium compound (including more than 100 units) is dissolved in a solvent to prepare a titanium containing solution (i.e., the second catalyst in Hori), the polymerization of the titanium compound is further progressed by the reaction with the aliphatic diol. As a result, the average particle size of the titanium compound in the solution of Hori is over 5 nm, as

demonstrated by Comparative Example 11. In contrast, because the titanium-containing solution of the present invention is prepared by using a monomeric or polymeric titanium compound including not more than 100 units, the average particle size of the titanium compound in the present solution is 5 nm or less.

At page 5, lines 5-12 of the outstanding Office Action, the Examiner states that “Comparative example 11 provide (sic) data for particles size (see Table 4 on page 103 of original Specification) of titanium containing solution obtained by dissolving titanium containing solid particle at 130°C during 2 hours. However, Hori pointed out that preferable temperature for preparation of titanium containing solution is from 140°C to 195°C. It is clear that aggregates of particles may be further broken at higher temperature. Because no data was presented for preferable range of temperature disclosed by Hori, than (sic) Applicant's arguments that titanium containing solution has different particles range (see Table 4) are not persuasive.”

Applicants respectfully disagree and submit that, as discussed above, the molecular weight (degree of polymerization) of the titanium compound is not reduced, but rather increased by dissolution. Therefore, the particle size of the titanium compound is not reduced, but is rather also increased at high dissolution temperatures, due to acceleration of the reaction between the titanium compound and the aliphatic diol. Moreover, Applicants submit that the particle size of the titanium compound in the solution of Comparative Example 11 is larger than 5 nm due to the increased degree of polymerization of the titanium compound before dissolution in the solvent, and not as a result of the dissolution temperature.

Evidently, Hori fails to teach or suggest a titanium-containing solution as presently claimed. For this reason alone, this rejection is improper and should be withdrawn. Moreover, as evidenced by the present Examples and Comparative Example 11 (discussed above), the present invention achieves superior and unexpected results, such as improved polymerization activity of polyester, which would not have been anticipated or suggested by the prior art.

Accordingly, Reconsideration and withdrawal of this rejection are respectfully requested.

### **Conclusion**

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and objections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Vanessa Perez-Ramos, Reg. No. 61,158, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.


Application No. 10/560,923  
Reply to Office Action of March 13, 2009

Docket No.: 1155-0288PUS1

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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Enclosure: Excerpt from *Encyclopedia of Chemical Technology*, 2<sup>nd</sup> Ed., Vol. 20, pp. 456 and 464